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TINACRUCIS NOROESTA, NEW SPECIES, NORTH AMERICA'S LARGEST TORTRICINE MOTH (TORTRICIDAE: ATTERIINI)

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ABSTRACT. The Neotropical tribe Atteriini is briefly charaeterized, and *Tinacrucis noroesta* is newly described in order to make the name available for a forthcoming book on moths of western North Ameriea. This speeies, the northernmost of the tribe, occurs in the Sierra Madre Oceidental, Mexico, and mountains of southern Arizona, where it was first collected in 1927. The larvae are believed to be polyphagous leaf rollers on broadleaf trees and shrubs but have not been diseovered in the field.

Additional Key words: Egg mass adornment scaling, sexual dimorphism, Chihuahua, Durango, Arizona, leaf-roller.

The Atterini comprises one of the smallest and most well defined tribes of the Tortricinae. Its monophyly is convincingly supported by a suite of uniquely derived morphological and behavioral characters associated with oviposition (Powell 1986). The adults are among the largest tortricid moths in the Western Hemisphere, FW length ranging to 22 mm. Females are eonspicuously larger than males, and there is pronounced sexual dimorphism in wing shape and color patterns in some genera (*Anacrusis, Tina, Tinacrucis*), whereas the sexes are similar in other genera (e.g., *Atteria, Templemania*). The eggs are laid in imbricate, overlapping patches, presumably a synapomorphy with Archipini and Sparganothini. Females possess obvious patches of corethrogyne scales covering the venter of A6 and A7; a thick pad of long, thin, dark scales on A6, which are spread over the egg mass and its periphery, and an enormous patch of upright, thicker scales on A7 that are curled at the tips, which are glued to the substrate in clumps, like a fence surrounding the egg mass. Most atteriines are nocturnal, but *Atteria* are diurnal and brightly colored, evidently specific Batesian mimics of *Pseudatteria* (Tortricinae: Polyorthini). Atteriine larvae are similar to sparganothines but are much larger leaf rollers. The distance between V setae on A9 is greater (1.5–2X) than on A8, the crochets are bi- or triordinal, and there is a well developed anal fork. I have reared several species of *Templemnaia, Tina*, and *Tinacucis* from eggs to maturity on synthetic diet, which suggests atteriines are polyphagous, and Dan Janzen and others have reared field collected larvae of Costa Riean *Anacusis* from several unrelated plant families, enhancing that assumption. The Atteriini includes about 40 described species assigned to eight genera, in addition to numerous undescribed taxa in Central and South America. A few species range into northern Mexico, one into Arizona.

Tinacrucis Powell, 1986, is distinguished by having elaborate antennal setulae in males, the costa sinuate in both sexes (unmodified in male *Anacrucis* and *Templemania*), markedly different size and FW pattern between the sexes (though not as extreme as in *Tina*), greatly enlarged A8 tergum, forming a hood enclosing the male genitalia. *Tinacrucis* includes six named species and several undescribed in Mexico and Central America. I have reared broods of several of them from single female egg masses, enabling association of the markedly differing sexes.

I have been aware of the species described here for 50 years, based on males taken by J.A. Kusche in the Chiricahua Mountains, Arizona, in 1927, but until recent years, we lacked sufficient material to confirm conspecificity of the Arizona species with specimens collected in Durango, Mexico. This species is described now because we discuss it in our forthcoming book, Moths of Western North America (Powell & Opler in press), scheduled for publication by the University of California Press in May, 2009. A treatment of the Sparganothini and Atteriini, by J. W. Brown and Powell, is in preparation for Moths of America North of Mexico, an appropriate place for this description, but it will be published later. Both of those volumes will include color images of the new species.

Tinacrucis noroesta Powell, new species
(Figs. 1, 2, male, female from
El Salto, Durango, Mexico)

This is the largest tortricine moth in America north of Mexico. Males have a relatively narrow FW with sinuate costa, pale beige to yellowish reticulated with rust lines and irregularly mottled with rust-brown. Females are larger with broader wings, pale chocolate- to rust-brown with faint darker and white banding in costal area when fresh and with huge masses of modified scales ventrally on abdominal segments 6 and 7.

FIG. 1. *Tinacrucis noroesta* Powell ♂—Mexico, Durango, W of El Salto, VII.5.1964 (J. Martin) CNC.

FIG. 2. *T. noroesta* Powell ♀ — Mexico, Durango, W of El Salto, VII.1.1964 (J. Martin) CNC.

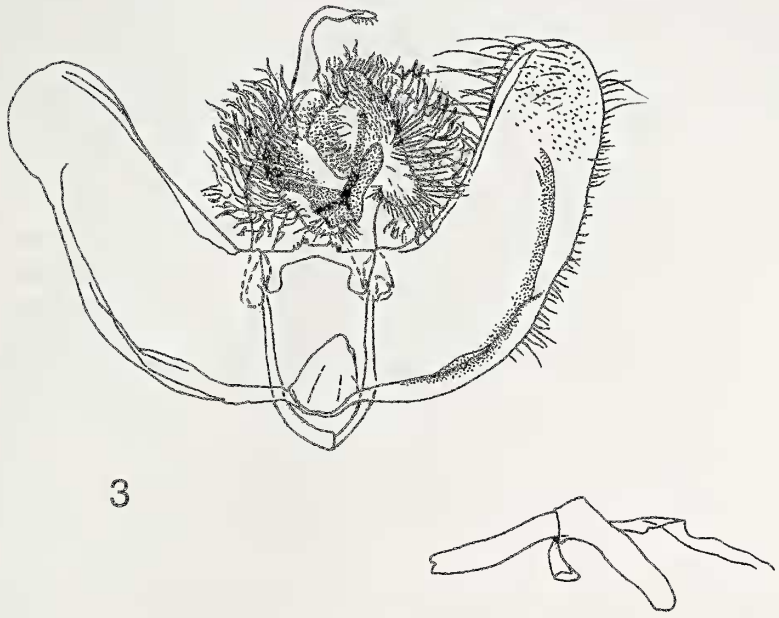

FIG. 3. *Tinacrucis noroesta*, male genitalia, ventral aspect, valvae spread; aedeagus, lateral aspect shown to right; **a**, aedeagus with vesica extended, revealing the deciduous cornuti.

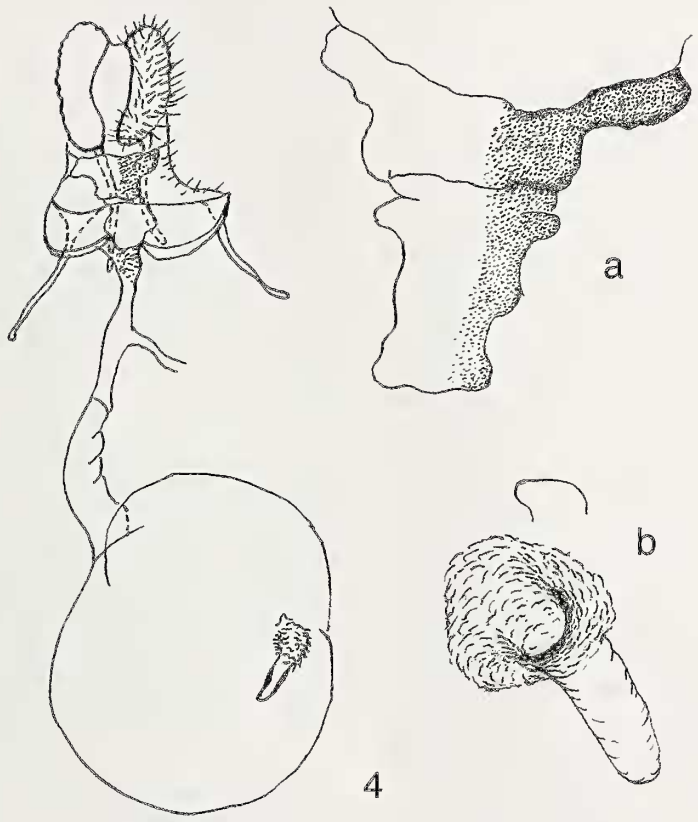

FIG. 4. *T. noroesta*, female genitalia, ventral aspect; **a**, detail of translucent ventral plate of A9; **b**, detail of signum, dorsal aspect.

Description. MALE. *Forewing.* Length 14.7-16.3 mm (n = 25), narrower than female, length 2.6–2.8 × width, costa sinuate, concave beyond middle, apex produced and subtended by concave terminal margin; ground color pale beige to yellow, reticulate with rust-brown along veins and numerous cross lines between veins, confined by rust-brown clouding to irregular blotches, basally, in cell, and subterminal area (resembling skeletonized spots on a fallen leaf); costal area beyond middle whitish in fresh specimens. *Hindwing.* Broad, pale cream colored, tinged with rust apically; underside variably mottled by rust in costal and apical areas, which is visible from above. *Abdomen.* Scaling pale beige to rust tinged caudally, venter paler, with segmental dark, medial spots. *Genitalia.* As in fig. 3 (drawn from paratype, El Salto, JAP slides 2893; n = 8); uncus only slightly flared apically, socii densely covered with elongate scales; joined tip of gnathos elongate, slightly flared; a pair of dentate projections on posterior margin of transtilla usually widely separated but adjacent in one specimen from Jalisco; basal half of valva with weakly projecting saccular ridge recessed from anterior margin; vesica with a compact group of 8 bladelike, deciduous cornuti situated in two rows; after dehiscence, the attachment scars are visible at high magnification (100X) on the withdrawn vescia near the phallobase/aedeagus junction.

FEMALE. *Forewing.* Length 17.0–20.0 mm (n = 6); broad, length 2.45–2.55 × width; costa weakly concave beyond middle; ground color milk chocolate- to rust-brown, showing faint transverse, whitish and dark bands on costal half beyond middle on fresh specimens; underside rust tinged; fringe narrowly rust. Hindwing. As in male. *Abdomen.* Scaling pale beige dorsally; venter paler, with large, medial, black spots on segments 3–5; A6 with a thick patch of thin, dark brownish scales; A7 with a conspicuous patch of upright, pale to dark scales, each bent at the tip. *Genitalia.* As in fig 4, a, b (drawn from paratype, Summerhaven, JAP slide 9080; n = 3); papillae anales broad, darkly pigmented, with raised setiferous nipples; sterigma a broad bowl subtending A9, which is modified as a translucent plate covered with tiny spicules, more densely at margins (4a); signum a densely wrinkled patch at bursa surface, preceded by a small, blind pouch, projected inwardly as a broad, weakly wrinkled, hollow blade (4b).

Holotype female: ARIZONA, Pima Co., Summerhaven, 7,800', Santa Catalina Mountains, emerged 10 December 1997, larva reared on synthetic diet from egg deposited by female collected 29 August 1997 (R. B. Nagle, JAP lot 97H9); in Essig Museum of Entomology, University of California, Berkeley.

Paratypes (35 ♂, 7 ♀): MEXICO, CHIHUAHUA, Sierra de la Catarina, 7,900', 18 rd. mi. NE Buenaventura, 1 ♂ VIII.21.1976 (J. & K. Donahue, LACM). DURANGO, 10 mi. W of El Salto, 9,000', 1 ♂ VI.13.1964, 5 ♂, 1♀ VII.5/29.1964 (J. Martin, CNC), 1 ♂ VII.30.1964 (Chemsak & Powell, EME), 1 ♂ VIII.8.1964 (Powell, EME). JALISCO, 18 km SW Sayula, 1 ♂ X.18.1992 (J. McCarty, EME). USA: ARIZONA, Apache Co., Greer, White Mts., 3 ♂ VIII.6/8.1962 (E. & I. Munroe, CNC), 2 ♂ VIII.5.1986 (R. Leuschner, RL), ♂ Alpine, 8,200', VIII.3.1986 (R. Leuschner, RL). Cochise Co., Barfoot Ridge, 8,500', Chiricahua Mts., 2 ♂, VIII.6.1927 (J. Kusche, CAS); Barfoot Park, 1 ♀ IX.27.1987 (N. McFarland, EME); Rustler Park, 3 ♂ VII.30.1987, 1 ♂ VII.24.1989, 1 ♂ VIII.7.1997 (R. & J. Robertson, EME), 1 ♂ VIII.6.1991 (Robertson & Powell, EME); Pinery Canyon, 6,500', Chiricahua Mts., 1 ♂ VIII.6.1991 (Robertson, EME); Pinery Canyon 6800' 1 ♀ VIII.1.2005 (K. Richers, KR); Miller Canyon, 6,200', Huachuca Mts., 1 ♂ VIII.7.1974 (Powell, EME). Graham Co., Soldier Creek Camp, 9,350', Graham Mts., 1 ♀ VIII.16.1974 (R. & J. Wielgus, USNM); Mt. Graham, Cunningham Campgr., 3 ♂ VII.20.2007 (C. Ferris, CF, EME). Pima Co., same data as holotype, 5 ♂, 2 ♀ VII.24 to VIII.29, 1991 to 1999 (EME, RN), 1 ♀ VIII.1996, eggs infertile (EME), 1 ♂ VII.21.1998, (D. Ferguson, USNM).

Diagnosis. The geographically nearest congener is *Tinacrucis apertana* (Walker), with which *T. noroesta* flies in the mountains of Durango, Mexico. I have reared *T. apertana* in Nuevo Leon from eggs, confirming association of the sexes. The two are similar, but the FW of *apertana* males has more extensive network pattern on a paler, cream yellowish ground, defining a broad, brown costal triangle; females of *apertana* have cream-tan FW, more or less uniformly strigulate with thin, brownish, transverse lines, with a brownish bar from mid-costa curving towards the tornus, and a poorly defined subterminal patch, contrasted with the more uniform rust tan of *noroesta*. *T. sebasta* (Walsingham), which was described from Guatemala and occurs in Mexico, has the reticulate pattern restricted to the basal half of the male FW, and the female FW pattern is similar to that of *apertana* but darker tan. The uncus of *T. apertana* has a wide, T-shaped apex, and that of *sebasta* is broadly spatulate subapically, tapering to the tip, whereas it is narrow, only weakly flared in *noroesta*. *T. apertana* and *sebasta* have narrower valvae than does *noroesta*, with a more distinct saccular ridge. The female signum is short and broad in *T. apertana*, elongate in *sebasta*, more slender than in *noroesta*.

In addition we have two male specimens from Mexico, Sinaloa, 8 road miles W of El Palmito, 6,400', X.12.1975 (Chemsak & Powell, EME), which are similar but differ in several respects. They are slightly larger than the other *T. noroesta* specimens, and their colors are richer, more contrasting yellow and brown. The male genitalia have a slender uncus, not flared. The dentate projections of the transtilla are closely adjacent, and there are slight differences in the valva. These specimens are provisionally considered to represent another population of *T. noroesta*.

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